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Patentanmeldung Nr. Patent application No. Demande de brevet n°

02076225.8

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Le Président de l'Office européen des brevets
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R C van Dijk

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Application no.: 02076225.8
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PAYS-BAS

Bezeichnung der Erfindung/Title of the invention/Titre de l'invention:
(Falls die Bezeichnung der Erfindung nicht angegeben ist, siehe Beschreibung.
If no title is shown please refer to the description.
Si aucun titre n'est indiqué se referer à la description.)

Programmable remote control and method for programming a programmable remote
control, readable memory and program

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Programmable remote control and method for programming a programmable remote control,
readable memory and program

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(72)

FIELD OF THE INVENTION

The invention relates to a remote control device comprising object keys, a selector for linking preset IR or RF code sets to the object keys to thereby enable the user to control functions of a device to be controlled via the remote control.

5 Said remote control device works on the following principles:

The remote control device (hereinafter sometimes also called 'remote control') usually has one or a multiple of modes (in which case it forms a multi-mode remote control), each one dedicated to a specific device to be controlled (TV, VCR, STB, ...), hereafter referred to as a device. Each mode has its own dedicated set of IR or RF codes (commands).

10 The device has a selector (which may comprise hardware and/or software alone or in combination) to attribute the code set data (linking) to the buttons (or more in general keys) on the remote control device. The mentioned set of IR or RF codes are here referred to as code-sets. The invention also relates to a method for programming a remote control.

15 BACKGROUND OF THE INVENTION

On the market there are a lot of different devices which all have their own device code-set to be able to control all features of a device to be controlled.

20 Due to limited code-set storage possibilities, a lot of look-a-like device code-sets are combined into one remote control code-set. Combining these device code-sets is a compromise between space and correctness of the code-set. This results for the user in certain buttons (object keys) of a code-set that might not have the desired effect on the device (no effect or wrong behavior).

25 It is for this reason that for one brand of a device most of the time multiple pre-set code-sets are proposed by suppliers. The user has the possibility to try out using the remote control all the proposed pre-set code-sets and pick the one that fits the best. In many cases, however, none of the proposed pre-set code-sets includes all IR or RF codes for all features of the device and as a result the user cannot make full use of the capabilities of the device he/she is trying to control using the remote control.

SUMMARY OF THE INVENTION

It is an object of the invention to provide for a remote control device as described in the opening paragraph which increases the capabilities of control on the devices to be controlled by the remote control.

5 To this end the remote control device is characterized in that the remote control device is arranged for enabling combination of a number of preset code sets into a single code set, comprising:

- a. a selector for selection of a preset code set by a user,
- b. an activator for activation of one or more links between an element of said 10 preset IR or RF code set and an object key by the user after selection
- c. a selector for subsequently selecting a further preset code set by the user and
- d. repeat means for repeating a to b on the further preset code set until all object keys are linked or the user terminates the process.

Element a, the selector and selection by the user of such preset code set are 15 also present in the known remote controls as explained above. However, as explained such selection often is imperfect leaving object keys which do not have the desired effect on the device (no effect or wrong behavior).

The remote control in accordance with the invention enables a user to pick IR or RF codes from different code-sets to be combined in a single mode. Or in other words, the 20 user himself compiles a code-set in such a way that all of the features of his device (or as many of the features as he likes to control) can be controlled. In the device of the invention a further preset code set is selected, and one or more of set object keys may be activated, which process is repeated until all object keys are activated or the user terminates the process. Within the framework of the invention 'combining' being able to make a combination of 25 preset code sets, by combining parts of several preset code sets. It may be a combination of any number of preset code sets.

This results in programming one mode of a universal remote control with data from more than one preset code-set, without, however, the user having to have intricate knowledge of programming techniques or having to have access to a computer. Nor do the 30 fundamental data have to be changed, since the preset code sets themselves remain unchanged as are the links between the content of the IR or RF code sets and the object keys. Thus, apart from the advantage to the end user, the invention offers an advantage for the suppliers of universal data-bases. Because of the limitations on the user interface the suppliers were obliged to organize their database code-set based instead of command based.

Within the framework of the invention 'object keys' are to be understood to encompass any functional element on the remote control by which the user can activate or change a certain function of the device (TV, DVD, VCR etc) to be controlled. Some examples of such 'object keys' are for instance simple buttons or designated areas of a touch screen (touch screen buttons), but may also be voice commands in cases where the remote control can be voice controlled. Such object keys may be a piece of hardware or software or a combination of hardware and software.

Preferably the remote control device comprises storage means for storing of preset IR or RF code sets, and in step a and c the preset code set and the further preset code set are selected from the preset code sets in the storage means of the remote control. In such embodiments the information (data) on the IR or RF code sets resides in the remote control device itself, namely in the storage means of the remote control. Alternatively, but within the broadest scope of the invention, the IR or RF code sets may be in a storage means (data base) separate from the remote control per se, for instance a PC or internet site, the remote control then having linking means to make a link to the preset code set in the separate data base. The selection and linking process is in essence the same. An advantage of such embodiments is that the number of different IR or RF code sets to choose from can be greatly increased. However, the disadvantage is that the remote control needs to be in constant, fast and errorless communication with the separate data base. At present such high quality of communication is difficult or costly to guarantee. However, on the one hand developments will lead to improvements in wireless communication between portable devices and data bases and on the other hand the number of different device to be controlled by the remote control increases, and thus the disadvantages of above described embodiments of the invention are foreseen by the inventor to become less, and the advantages greater.

Preferably the remote control device is a multi-mode remote control, i.e. a mode control that is designed to operate (control) several different devices (TV, DVD, VCR). Although this forms a preferred embodiment of the invention, it is remarked that the invention is also very useful for remote controls that are designated for one type of device (for instance a TV or DVD etc), but are universal in the sense that they can control many or all different brands and types of TV's or DVDs etc.

Preferably the remote control comprises a proposer for proposing a preset code set to a user prior to step a (selection of a preset code set).

Proposing a preset code set to the user enables the user to more quickly find the preset code set which has likely the most 'useful' elements. This improves the speed and efficiency of the linking process.

Within the framework of the invention a 'proposer' may be formed by

5 hardware, such as circuit or parts or parts of circuits, and/or software, such programs or parts of programs, alone or in combination which enables to propose to the user a preset code set. Such proposal may be in a visual form (one or more preset code sets are indicated on a touch screen for instance) or for instance by means of sounds.

Preferably the remote control device comprises a showing means for showing,

10 in between selection of a preset code set (a) and activation of links (b), the effect of linking.

Showing may take the form of indicating the effect of linking, for instance by displaying the function. The remote control may show a message 'this button will control sound', or simply indicate 'sound' on the button, which is possible with touch screens.

Alternatively or in addition, the showing means may be arranged to allow the user to try-out

15 the button.

Preferably the remote control comprises a further proposer for proposing a

node set prior to step c (selection of a further preset code set). This further

proposer may be different from the previously described proposer, may be the same or share

parts of hardware or software.

20 Preferably the remote control comprises a communicator to communicate after step b unlinked object keys to the user.

Within the framework of the invention a 'communicator' may be formed by

hardware, such as circuit or parts or parts of circuits, and/or software, such programs or parts of programs, alone or in combination which enables to propose to the user a preset code set.

25 Such communication may be in a visual form (one or more preset code sets, i.e. the as yet unlinked ones, are highlighted on a touch screen for instance) or for instance by means of sounds.

Communication of the yet unlinked keys enables the selection and linking process to be more efficiently performed.

30 The remote control preferably comprises a touch screen which enables easy proposal and/or selection of preset code sets, easy activation of links between data and object keys and easy communication in general between remote control and user in general.

The storage means of the remote control may be or comprise a piece of hardware (such as a circuit or a part of a circuit or a data storage medium) or software (such as a program or part of a program, or a software data bank).

In an embodiment the remote control comprises means to store IR or RF code sets from outside the remote control into the storage means of the remote control. In such embodiments the user may down-load IR or RF code sets (either in a wireless fashion or by a link to for instance the internet) from outside the remote control into the storage means. This allows for an 'up-dating' of the data stored in the storage means.

In the method in accordance with the invention data of more than one preset code set of a remote control are compiled into a single IR or RF code set by using the following method steps:

- a. a preset code set is selected by the user,
- b. links between an element of said preset IR or RF code set and an object key are activated whereafter
- c. a further preset code set is selected by the user and steps a to b are repeated on the further preset code set until all object keys are linked or the user terminates the pro

Preferably the method in accordance with the invention comprises the following step, prior to step a.

- a'. a preset code set is proposed by the remote control to the user
- Preferably the method in accordance with the invention comprises the following step, prior to step c.
- c'. a further preset code set is proposed by the remote control to the user.

More preferably the method in accordance with the invention comprises the following step, prior to step c and/or c':

- c''. unlinked object keys are communicated to the user by the remote control.
- The invention also relates to a programmable remote control device comprising object keys, and having a memory, said memory comprising means for storing a number of preset IR or RF code sets, further comprising an executable program or set of programs, said program or set of programs comprising:
 - program code for selecting a stored preset IR or RF code set by a user,
 - linking an element of said preset IR or RF code set and an object key are upon activation by the use and
 - program code to, thereafter selection of a further preset code set by the user

and program code to repeat and steps a to b are repeated on the further preset code set until all object keys are linked or the user terminates the process.

The invention further relates to a readable memory for use in a programmable remote control device as well as to a program or set of programs for use in a programmable
5 remote control device.

Such readable memories as well as the program or set of programs, whether they are stored in a memory (which can be an interchangeable part of the remote control device), on a readable medium (such as disc or CD) or transmitted by a wire-less manner (for instance taken from the internet) also form embodiments of the invention.

10 These and other aspects of the invention are apparent from and will be elucidated with reference to the embodiments described hereinafter.

BRIEF DESCRIPTION OF THE DRAWINGS

In the drawings:

15 Fig. 1 to 13 illustrate the remote control in accordance with the invention by means of steps of a method for programming the remote co

Fig. 1 illustrates the invention in a general

Fig. 2 shows in an example the opening menu on a touch screen of remote control.

20 Fig 3 shows the following screen in the menu,

Fig. 4 to 13 show subsequent screens.

The Figures are not drawn to scale. Generally, identical components are denoted by the same reference numerals in the Figures.

25

DETAILED DESCRIPTION OF PREFERRED EMBODIMENTS

Figure 1 illustrates the invention. Schematically is indicated that the remote control comprises several preset IR or RF code sets, (usually in a software form) here shown as preset code set X1 (Brand X, IR or RF code set 1) preset code set X2 (Brand X, IR or RF
30 code set 2) en preset code set Y1 (Brand Y, IR or RF code set 1). Said preset code sets may be present in the device as bought by the consumer and/or the remote control device has a storage means which can be filled with said preset-code sets by means of for instance downloading them. A combination is also possible wherein a number of preset code sets are prestored, but yet the remote control device offers the possibility to increase the number of

preset code sets. The latter may be very useful since it would allow 'up-dating' the remote control with novel preset IR or RF codes for novel types of devices or even novel devices. In yet a further embodiment within the overall scope of the invention the remote control device comprises a link to an IR or RF preset code set in a separate data bank.

5 Schematically is indicated that after the combination process of combining data from several preset code sets into single code set (herein named 'chosen code-set'), the object keys 1, 2, 4, 5, 6 and 8 are linked to data (commands) from the preset code set X1; object keys 3 and 7 to data (commands) from the code set X2, and object keys 9 and 10 are linked to data (commands) from code set Y1. The chosen code set is a compilation, compiled
10 by the user, in which in a single code set data the preset code sets X1, X2 and Y1 are combined. All object keys are functional and which function they perform the user is able to check before compiling. This greatly increases the usefulness of the device without however requiring additional data sets other than the preset data sets or requiring a high level of programming expertise on the part of the user.

15 The invention will hereinbelow be further exemplified by means of an example.

Example:

20 Defining the Code-set of Your Devices

A Remote Control uses RC (Remote Control) codes to activate devices. Because there are several brands using specific RC codes, the user has to define the brands of his/her devices.

25 Figure 2 shows a starting screen of the menu on a remote control. This starting screen is hereinbelow also denoted by 'Home panel'. This example is a preferred embodiment in which the remote control is provided with a touch screen for easy interaction between remote control and user. On the Home panel buttons are shown for most common video and audio devices (Fig. 2). 'Buttons' are also named 'object keys' within the
30 framework of this invention. By pressing a button a certain action is initiated. In a touch screen 'pressing' includes 'touching'. When a selection of a device is made by touching or pressing on a button shown on the touch screen of the remote control on the Home panel for the first time, the Remote Control will likely be set up by default to operate on a particular brand (usually the same as the brand of the supplier of the universal control) in this example

Philips devices. For all devices other than Philips, you will have to define the brand before you can operate them with the Remote Control. Figure 3 shows a type of screen that could be shown. In this example it is assumed that the language used in English, the remote control may start the menu with a screen prior to the Home panel in which the user may define the
5 language (English, German, Japanese, Chinese, French, Spanish etc).

By pressing a button on the home panel the user selects a device on the Home panel, in this case a TV by pressing on the 'TV' button 2.

10 The screen as shown in Figure 3 then appears in which it is stated that a particular brand RC code are installed in the device and whether or not one wants to change this.

When the brand of the TV is indeed the indicated brand, the user clicks No whereafter the

the Remote Control will switch to the Use mode too operate the device in Use mode .

15 -or-

When the user wants to adjust the Remote Control to operate with a particular brand . Yes.

20 The Remote Control will then switch to the Brand mode (via for instance the screen shown in Figure 4) enabling a selection of Brands and Code Sets when the next button is clicked after which a screen schematically shown in Figure 4 appears.

A list of brands and their corresponding RC codes are stored in the Remote Control's memory enabling to select a particular brand from a list 5 (fig. 5) . Because not every device of a certain brand uses the same RC codes, the user may also have to select a set of RC codes for his/her brand

25 A scrollable list of brands 5 for the selected device and a "virtual auto-zooming" mini-keyboard appears. The user then navigate through the list of brands using the scroll buttons  and  to scroll up or down in the list of brands.

By tapping the scroll buttons, scrolling through the brands one by one is made possible.

30 By holding down the scroll buttons, the scrolling speed increases.

The user will next select a brand in the list (see Figure 6) in which list the selected brand is highlighted. The Search button switches into Next.

The user will then tap Next.

When the selected brand uses only one set of RC codes, the Remote Control switches to Try mode, i.e. a mode in which the user may try out what the different buttons stand for. Alternatively the 'try-out' mode may be a 'show-the-user-what-is-what' screen in which the function are indicated on the buttons.

5 When there are several code sets for the selected brand, a list 5 of code sets for the selected brand may appear (Fig. 7).

It is also possible to select the code set for the particular device by means of the following steps:

- Select a code set from the list 5.

10 Preferably the RC code sets are ranked in the list proposed by the device wherein the first RC code set in the list is used for most devices of the selected brand.

The selected code set is highlighted (fig. 6). The Search button switches to Next.

15 - Tap Next.

The Remote Control switches to Try mode. Continue with step illustrated in Figure 9. Figure 9 shows the device control panel, the user can try one or more buttons. The first control panel of the selected device is displayed and the user may try out a button on the control panel and check if the device is responding to the RC code the Remote Control is sending. After pressing the key the next screen will appear (fig. 10).

20 When not satisfied with the selected RC code, the user taps on the 'Back' object key which will bring him back to the step illustrated in Figure 9 and 11 (Figure 11 shows the repeat step of Figure 9) he/she can try the next button and then he continues with the step illustrated in Figure 10.

25 -or-

when satisfied with the way the device is responding to the selected RC code, the user taps Next and the code for that particular pressed button (object key) will be installed (activated). On the control panel the installed button will preferably change color (or be highlighted) to communicate to the user which key(s) is (are) already installed. The user thereafter tries the next button and continues from the step illustrated in Figure 9 and 11.

30 When all buttons on the control panel are tried, the following screen appears (Fig. 12).

When all buttons have given a satisfying response, the user taps Next and the device is now fully installed and the user continues with defining other devices on the home

panel (for instance when use is made of a multi-mode remote control device) or terminates the process.

-or-

When some buttons did not give a satisfying response, the user taps Back

5 whereafter the remote control will again propose to select a new brand from the list (Figures 5 to 7). Alternatively the user may directly select a brand from the list. This new brand will only have effect on those buttons that were not installed in the last steps (steps illustrated in Figures 9 to 11). For selecting the brand the same procedure may be used as illustrated by Figures 5 to 8. After the last step (Figure 8) is passed, the control panel (Figure 9) appears

10 again. This time the buttons that were already installed in previous steps are preferably already indicated in a different color or in another manner highlighted. The remote control will only request for the leftover buttons to install.

For these buttons or more in general object keys the user then continues the steps illustrated in Figures 9 to 13. If after said iteration all buttons are installed (activated)

15 the process is stopped, if not this iteration will be repeated until all buttons are installed.

This repetitive procedure will lead to activation (in

11 object keys or at least as many objects keys as the user wishes to install said

having the functions the user wishes said keys to have. After activation of all .
object keys (or as many object keys as the user wishes to install) the chosen code set is finished. Preferably the

20 remote control device comprises a fixer (which may be hardware or software or a combination thereof) to fix the chosen code set (i.e. enter it into the RC code set data base) and give it a name ('user1' for instance). When the remote control malfunctions (for instance when the batteries have been exhausted) the user may easily reinstall the chosen code set by choosing 'user1' from the proposed list or immediately selecting 'user1'. When reinstalling,

25 the remote control will preferably start the process with proposing the previously chosen code sets (user1, user2 etc.).

The installing process may be repeated for other devices (DVD-player for instance) until all other devices on the Home panel the user wants to operate are properly installed. Preferably the proposer of the remote control device comprises means to fine-tune

30 the list of proposed RC code sets (list 5) for a to be installed device on the basis of the previously chosen code sets. The following example may be given: When a consumer has installed a chosen code set for a high end consumer product, such as for instance for a PDP display, it is likely that he/she will also have an high-end DVD device or other high-end device. The proposer of the remote control will then put high-end RC code sets (i.e. code sets

associated with high-end devices) on the top of list of selectable code sets, rather than the RC sets of the most widely used devices of the particular brand. When a person has previously installed a code set for a low end device, the proposer will put for other devices also 'low-end' code sets on top of the lists.

5 While the invention has been described in connection with preferred embodiments, it will be understood that modifications thereof within the principles outlined above will be evident to those skilled in the art, and thus the invention is not limited to the preferred embodiments but is intended to encompass such modifications. Modifications include amongst others any and each combination of above described features and
10 characteristics even if not explicitly described in the claims.

Any reference signs do not limit the scope of the claims. The word "comprising" does not exclude the presence of other elements than those listed in a claim. Use of the word "a" or "an" preceding an element does not exclude the presence of a plurality of such elements

15 In short the invention can be described as follows:

A remote control comprising object keys and a selector for linking preset IR or RF code sets to the object keys. The selector comprises:

- a selector for selecting a IR or RF preset code set by a user,
- an activator for activation of one or more links between an element of said preset IR or RF code set and an object key by the user after selection
- a selector for subsequently selecting a further preset code set by the user and repeat means for repeating a to b on the further preset code set until all object keys are linked or the user terminates the process.

This allows the user to combine more than one preset code set into a single
25 code set.

CLAIMS:

29 03. 2002

(72)

1. Remote control device comprising object keys, a selector for linking preset IR or RF code sets to the object keys to thereby enable the user to control functions of a device to be controlled via the remote control, characterized in that the remote control device is arranged for enabling combination of a number of preset IR or RF code sets into a single code set, comprising:
 - a. a selector for selecting a IR or RF preset code set by a user,
 - b. an activator for activation of one or more links between an element of said preset IR or RF code set and an object key by the user after selection
 - c. a selector for subsequently selecting a further preset code set by the user and
 - d. repeat means for repeating a to b on the further preset code set until all object keys are linked or the user terminates the process.
2. Remote control device as claimed in claim 1, characterized in that the remote control device comprises storage means for storing of preset IR or RF code sets, and in step a and c the preset code set and the further preset code set are selected from the preset IR or RF code sets in the storage means.
3. Remote control device as claimed in claim 1, characterized in that the remote control device is a multi-mode remote control.
4. Remote control device as claimed in claim 1, characterized in that the remote control comprises a proposer for proposing a preset code set to a user prior to selection of a preset code set (a).
5. Remote control device as claimed in claim 1, characterized in that the remote control device comprises a showing means for showing in between selection of a preset code set (a) and activation of links (b) the effect of linking.

6. Remote control device as claimed in claim 1, characterized in that the remote control comprises a further proposer for proposing a further preset code set prior to selection of a further preset code set (c).

5 7. Remote control device as claimed in claim 1, characterized in that the remote control device comprises a communicator to communicate after linking (b) yet unlinked object keys to the user.

10 8. Remote control device as claimed in claim 1, characterized in that the remote control comprises a touch screen.

9. Remote control device as claimed in claim 1, characterized in that the remote control device comprises storing means to store IR or RF code sets from outside the remote control device into the storage means of the remote control device.

15 10. Method for programming a remote control device characterized by the fact that data of more than one preset IR or RF code set of a remote control are combined into one IR or RF code set by using the following method steps:

- a. a preset code set is selected by the user,
- 20 b. links between an element of said preset IR or RF code set and an object key are activated whereafter
- c. a further preset code set is selected by the user and steps a to b are repeated on the further preset code set until all object keys are linked or the user terminates the process.

25 11. Method for programming a remote control device as claimed in claim 10 characterized in that the method comprises the following step, prior to selection of a preset code set (a):

- a'. a preset code set is proposed by the remote control device to the user.

30 12. Method for programming a remote control device as claimed in claim 10 characterized in that the method comprises the following step, prior to selection of a further preset code set (c):

- c'. a further preset code set is proposed by the remote control device to the user.

13. Method for programming a remote control device as claimed in claim 10, characterized in that the method comprises the following step, prior to selection of a further preset code set:

c". unlinked object keys are communicated to the user by the remote
5 control device.

14. Method for programming a remote control device as claimed in claim 10, characterized in that preset IR or RF codes are transferred from a device outside the remote control device and stored into the storage means.

10

15. Method for programming a remote control device as claimed in claim 10, characterized in that the remote control device comprising storage means for preset IR or RF code sets and in step a and c the mentioned preset code set and the further preset code set are stored in the storage means.

15

16. A programmable remote control comprising object keys, and having a memory, said memory comprising means for storing a number of preset IR or RF code sets, further comprising an executable program comprising a set of programs, said program or set of programs comprising:

20 a. program code for selecting a stored preset IR or RF code set by a user,
b. linking an element of said preset IR or RF code set and an object key are upon activation by the user and
c. program code to, thereafter selection of a further preset code set by the user
d. and program code to repeat steps a to b are repeated on the further preset
25 code set until all object keys are linked or the user terminates the process.

17. A programmable remote control as claimed in claim 16 characterized in that the program or set of programs comprises:

a program code for proposing a preset IR or RF code set to the user.

30

18. A programmable remote control device as claimed in claim 17, characterized in that the program or set of programs comprises:

19. A program code for proposing a further IR or RF code set to the user.

20. A readable memory for use in a programmable remote control device as claimed in claim 16.

21. A program or set of programs for use in a programmable remote control device as claimed in claim 16.
5

ABSTRACT:

29 03. 2002

(72)

A remote control comprises object keys and a selector for linking preset IR or RF code sets to the object keys. The remote control comprises:

- a selector for selecting a IR or RF preset code set by a user,
- an activator for activation of one or more links between an element of said preset IR or RF code set and an object key by the user after selection
- a selector for subsequently selecting a further preset code set by the user and
- repeat means for repeating a to b on the further preset code set until all object keys are linked or the user terminates the process.

This allows the user to combine more than one preset code set into a single
10 code set.

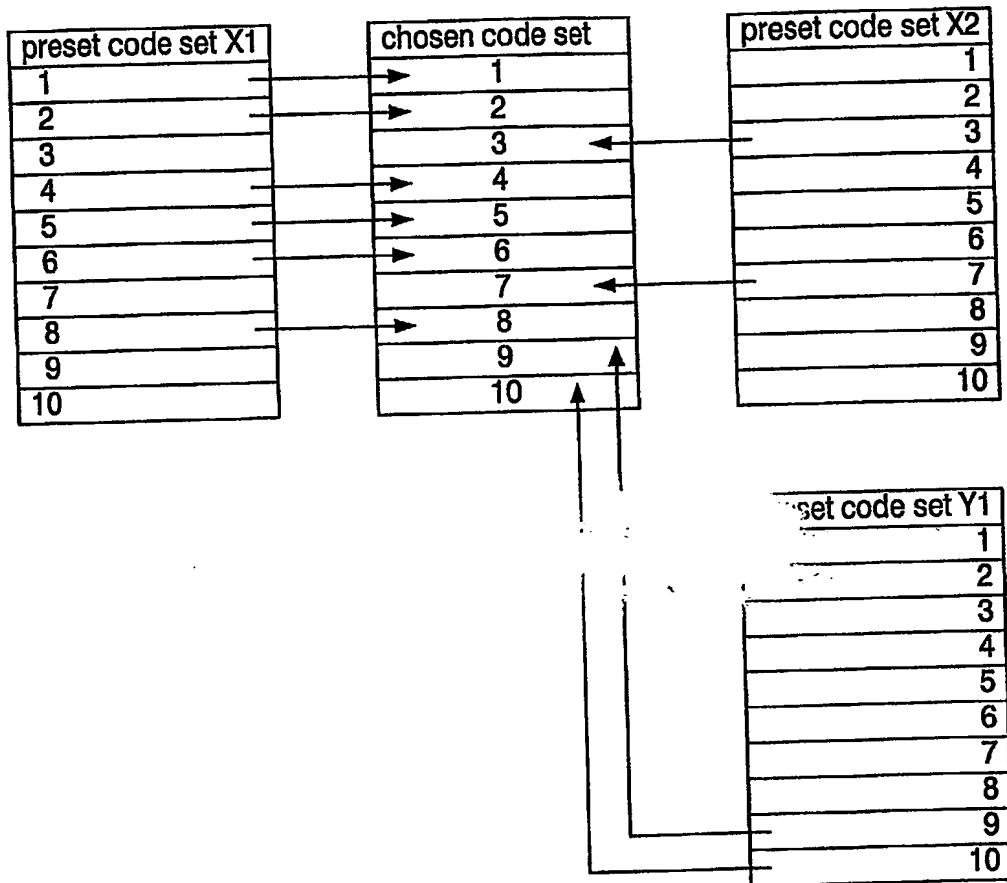


FIG. 1

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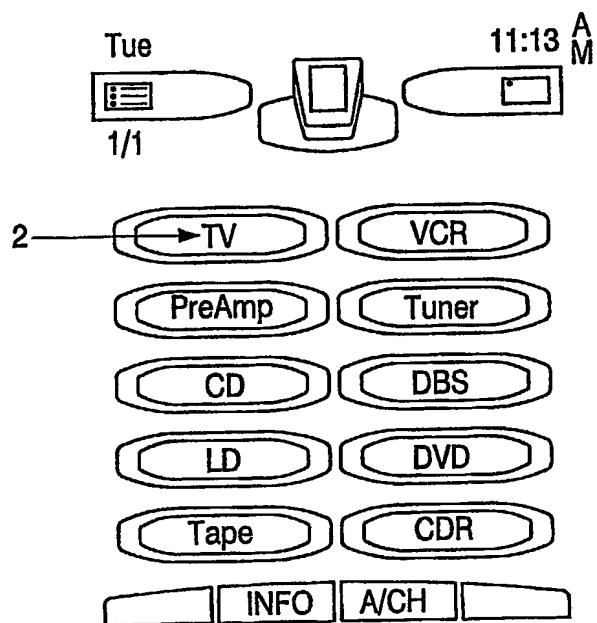
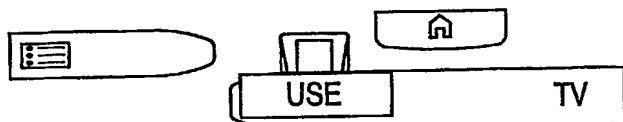


FIG. 2



Philips RC codes are
installed in this device
Do you want to change it?

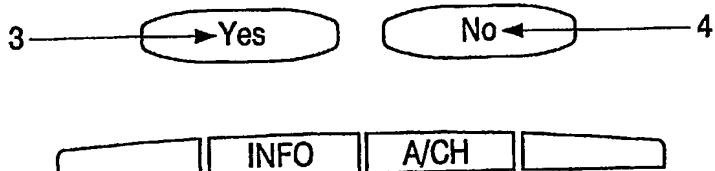


FIG. 3

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In the next screen tap
your brand in the list
If your brand is not
listed, press Search

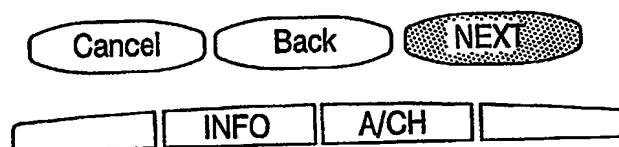


FIG. 4

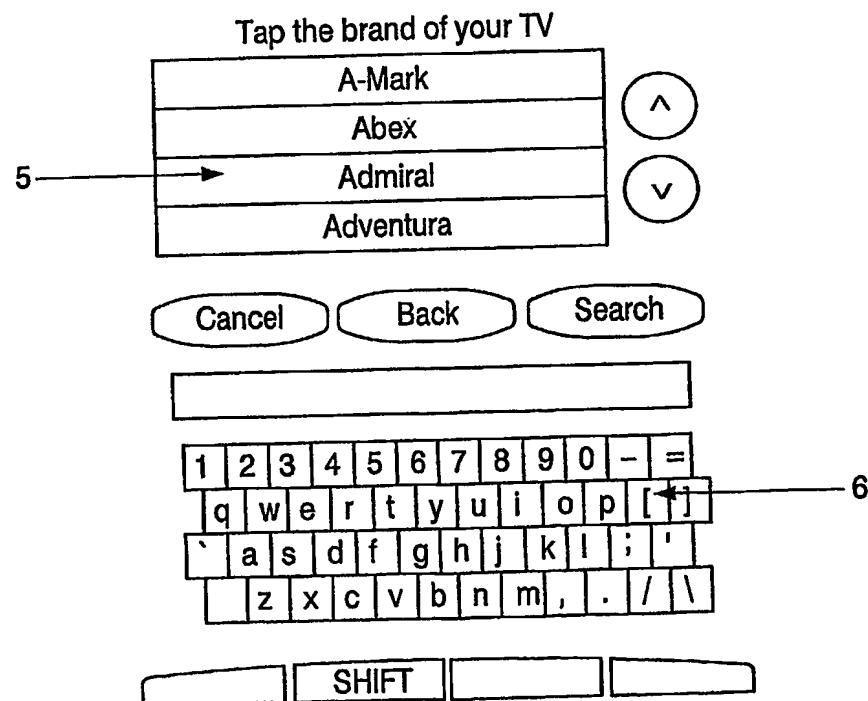


FIG. 5

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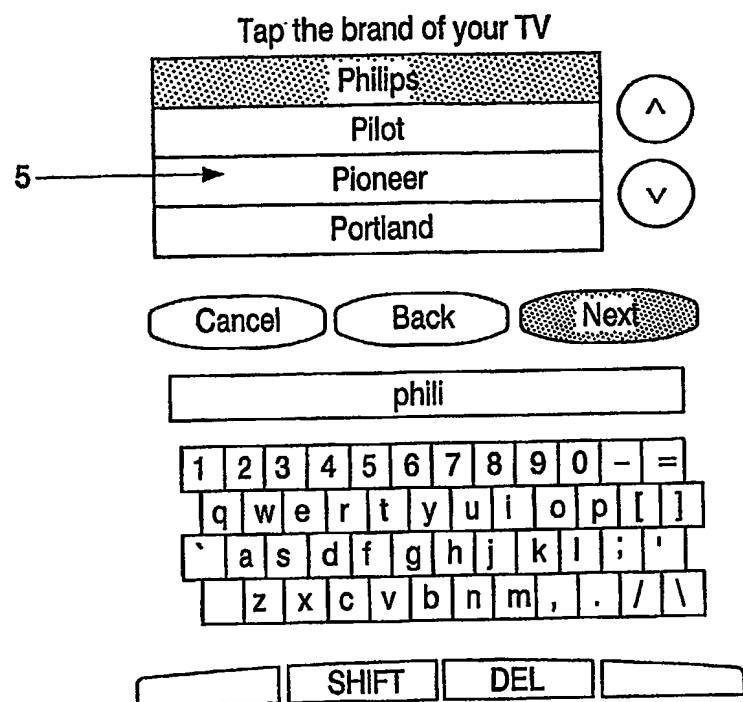
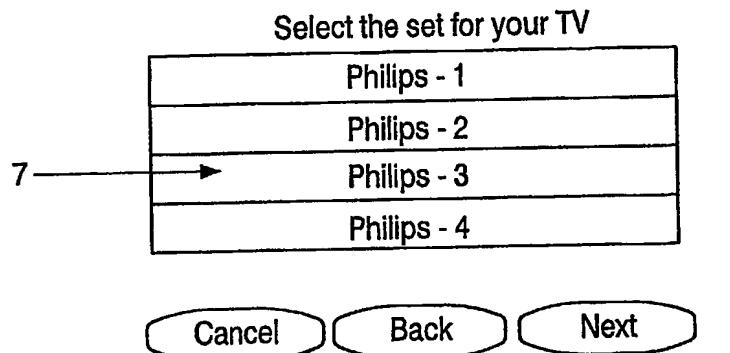


FIG. 6



This brand has 4 RC code sets
Tap one or press Search to
step through all possibilities

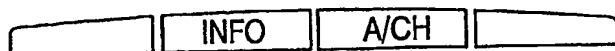
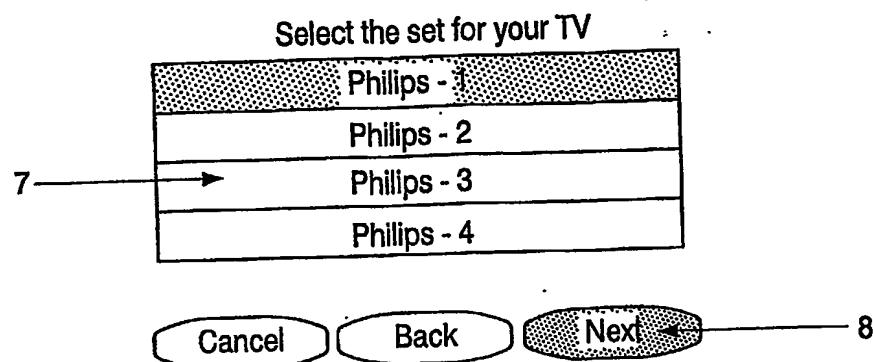


FIG. 7

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This brand has 4 RC code sets
Tap one or press Search to
step through all possibilities

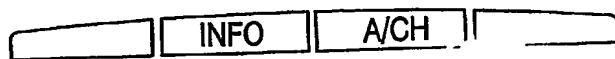


FIG. 8

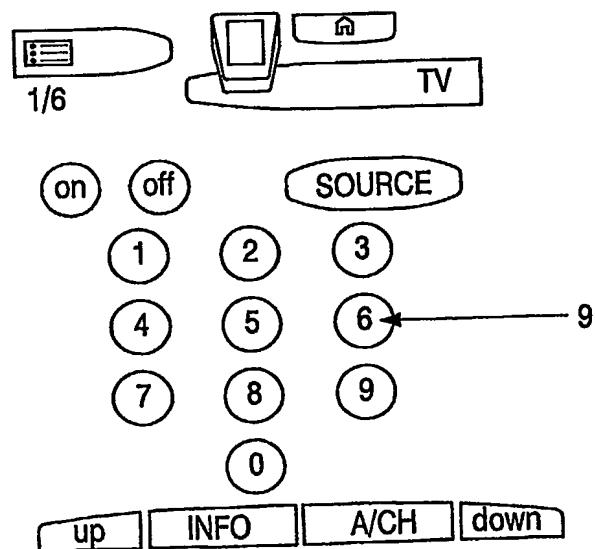


FIG. 9

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If your TV functions
properly, press Next,
otherwise press Back

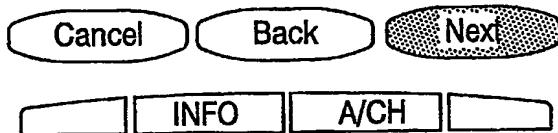


FIG. 10



on off SOURCE

1 2 3
4 5 6
7 8 9
0

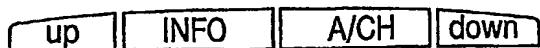


FIG. 11

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If all buttons are
installed, press Next
Else press Back

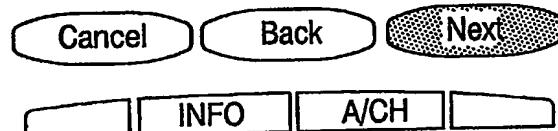


FIG. 12

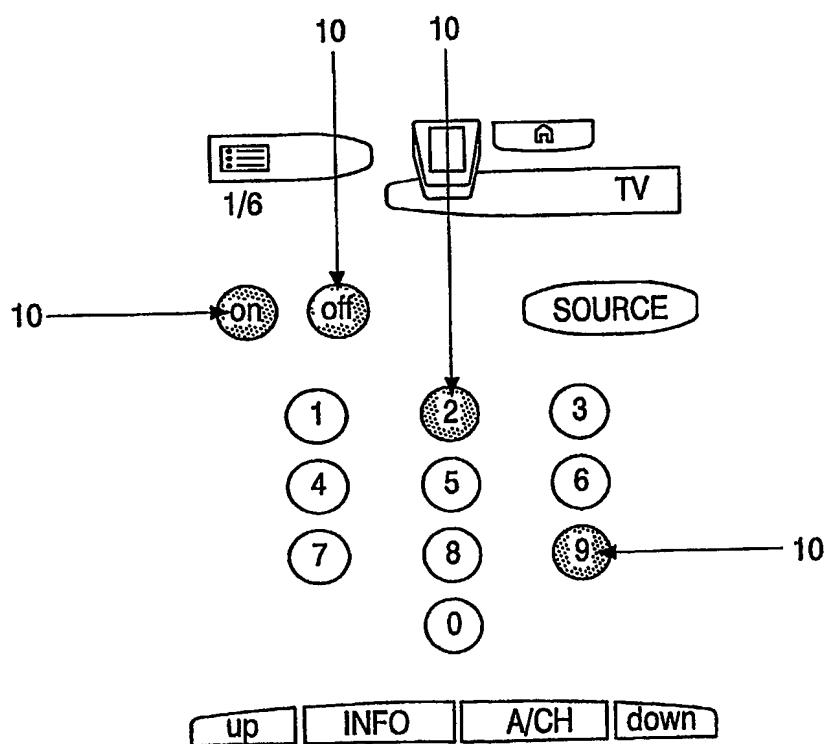


FIG. 13

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